1. An apparatus for delivering a compound through an epithelial tissue layer, the apparatus comprising

a reservoir for containing a coupling medium suitable for mixing with the compound, wherein the reservoir is arranged to enable the coupling medium to directly contact a surface of the epithelial tissue layer; and

an energy source arranged and controlled to propagate an impulse transient within the coupling medium when in the reservoir.

2. An apparatus of claim 1, wherein the energy source is a laser, and the apparatus further comprises a target material arranged between the laser and the reservoir, and wherein the reservoir is configured to enable the target material to directly contact the coupling material in the reservoir.

3. An apparatus of claim 2, wherein the target material is a metal foil or plastic sheet.

4. An apparatus of claim 1, further comprising a transparent material bonded to a surface of the target material and interposed between the surface and the laser, and arranged to confine pressure forces resulting from ablation of the target material within the reservoir.

5. An apparatus of claim 1, wherein the energy source is a lithotriptor.

6. An apparatus of claim 3, wherein the metal foil comprises aluminum or copper.

7. An apparatus of claim 2, wherein the target material comprises a polymer.

8. A system for delivering a compound through an epithelial cell layer in an animal, the system comprising

an apparatus of claim 1; and

a coupling medium suitable for mixing with the compound.

9. A method of delivering a compound through an epithelial tissue layer, the method comprising:

(a) mixing the compound with a coupling medium to form a compound-coupling medium mixture;

(b) contacting a surface of the epithelial tissue layer with the compound-coupling medium mixture; and

(c) propagating one or more impulse transients through the compound-coupling medium mixture to contact and enter the epithelial tissue layer, whereby the compound passes through the epithelial tissue layer.

10. A method of claim 9, wherein each impulse transient is a broad-band compressive wave having a rise time of at least 1 ns and a peak pressure of at least 300 bar and no more than 2000 bar.

11. A method of claim 9, wherein the impulse transient is generated by exposing a target material to a pulsed laser beam.

12. The method of claim 11 wherein a transparent material is bonded to a surface of the target material.

13. A method of claim 9, wherein the compound is a nucleic acid.

14. A method of claim 9, wherein the compound is an anti-neoplastic agent.

15. The method of claim 11, wherein the target material comprises a metallic foil or a plastic sheet, and wherein the impulse transient is generated by a laser-induced plasma formed by ablation of the target material.

16. The method of claim 15, wherein the metallic foil comprises aluminum or copper.

17. The method of claim 11, wherein the target material comprises a polymer.

18. The method of claim 11, wherein the target material comprises an absorbing material, and wherein the impulse transient is generated by laser-induced rapid heating of said absorbing material.

19. A method of claim 9, further comprising a step of applying hydrostatic pressure.

20. A method of claim 9, wherein the epithelial tissue layer is stratum corneum.

21. A method of claim 9, wherein said coupling medium further comprises a surfactant.

22. A method of claim 21, wherein said surfactant is sodium lauryl sulfate.

23. A method of claim 11, wherein the impulse transient has a peak pressure of 550-650 bar.

24. A method of claim 11, wherein the impulse transient has a rise time of about 75-125 ns.